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(54) **HEAT DISSIPATING STRUCTURE OF LED LAMP CUP MADE OF POROUS MATERIAL**

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(51) **Int. Cl.**

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F21V 5/00	(2006.01)
F21V 3/00	(2006.01)
B60Q 1/06	(2006.01)

(52) **U.S. Cl.**
USPC **362/294**; 362/311.02; 362/264; 362/373

(58) **Field of Classification Search**
USPC 362/311.02, 294, 264, 373
See application file for complete search history.

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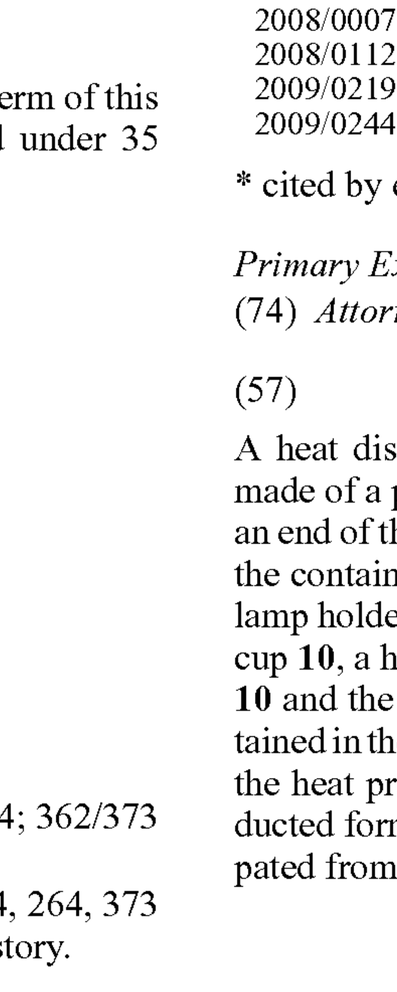
(57) **ABSTRACT**

A heat dissipating structure of a lightweight lamp cup **10** made of a porous material includes a containing cavity **11** at an end of the lamp cup **10**, a lamp holder **30** at another end of the containing cavity **11**, a metal hood **60** sheathed with the lamp holder **30** and covered onto an external side of the lamp cup **10**, a heat conduction medium **50** between the lamp cup **10** and the metal hood **60**, and a light emitting unit **20** contained in the containing cavity **11** of the lamp cup **10**, such that the heat produced by the light emitting unit **20** can be conducted form the lamp cup **10** to the metal hood **60** and dissipated from the metal hood **60** to the outside.

8 Claims, 5 Drawing Sheets



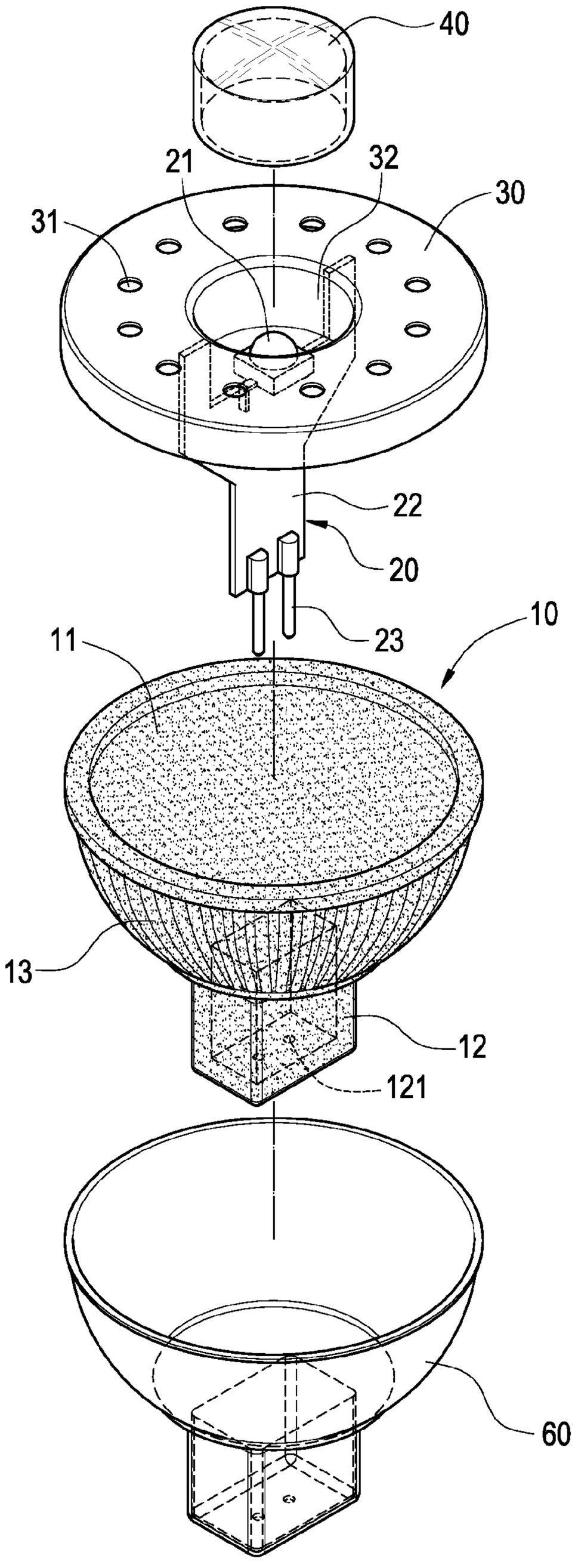


FIG.1

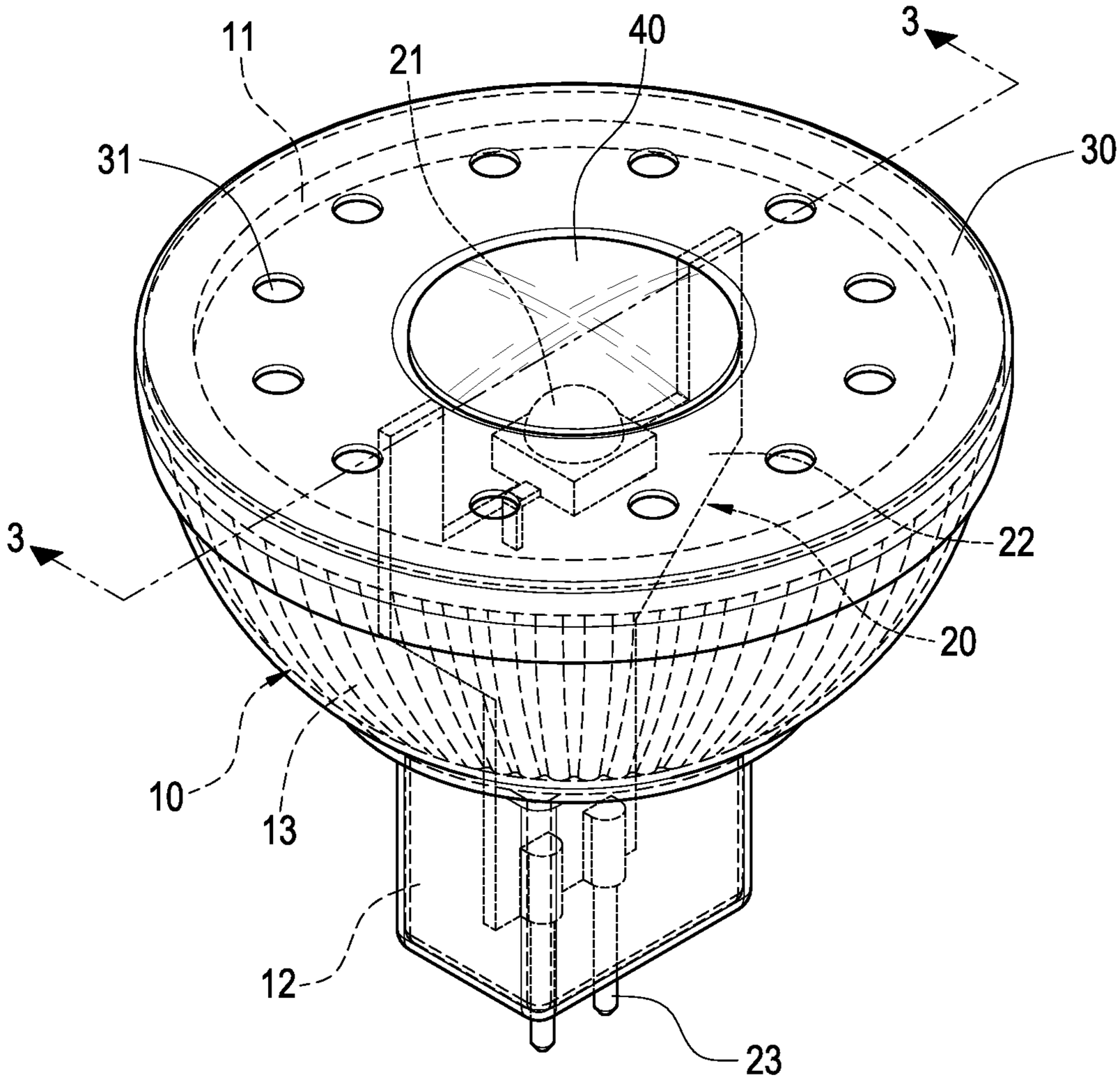


FIG.2

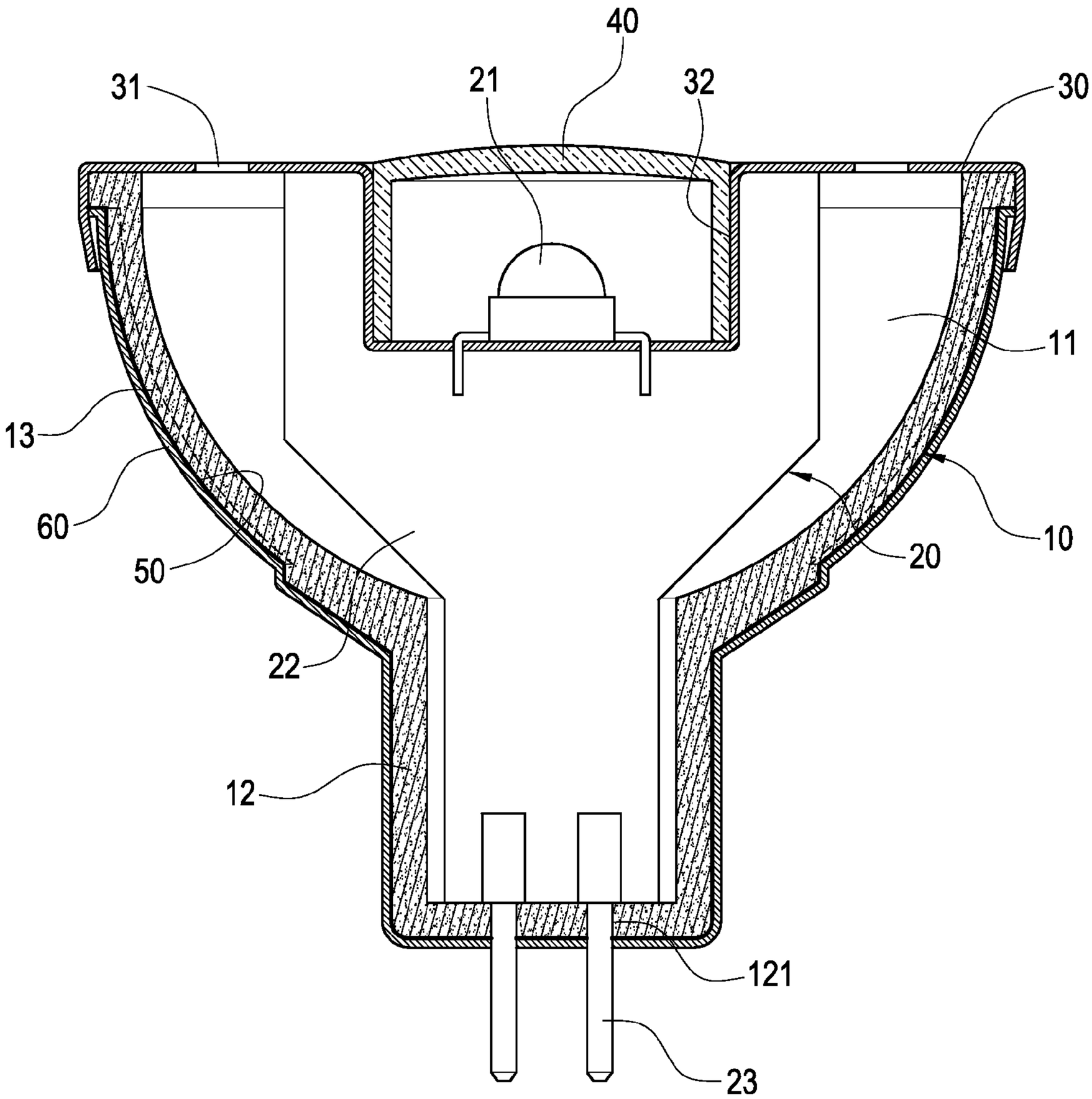


FIG.3

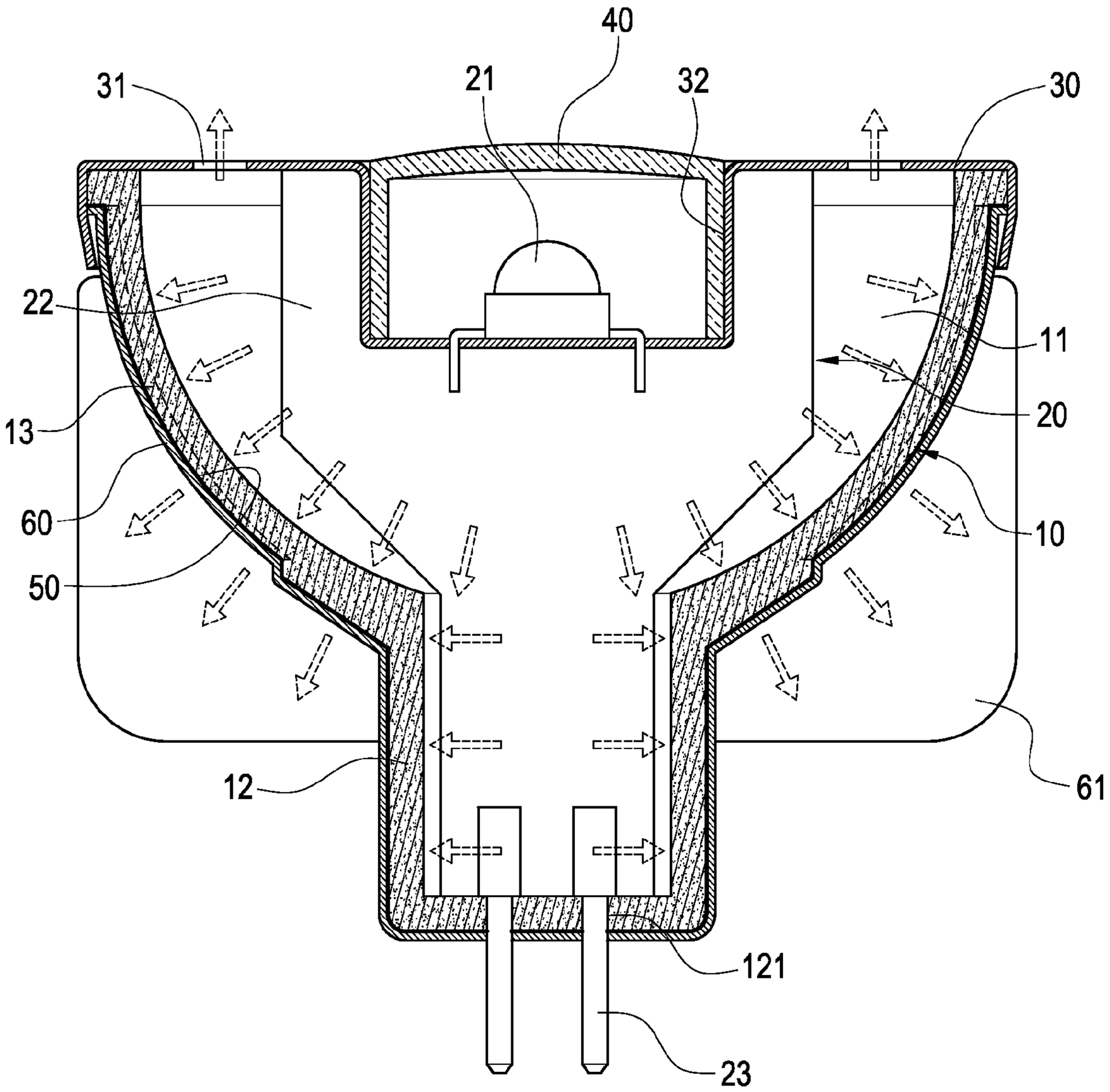


FIG.4

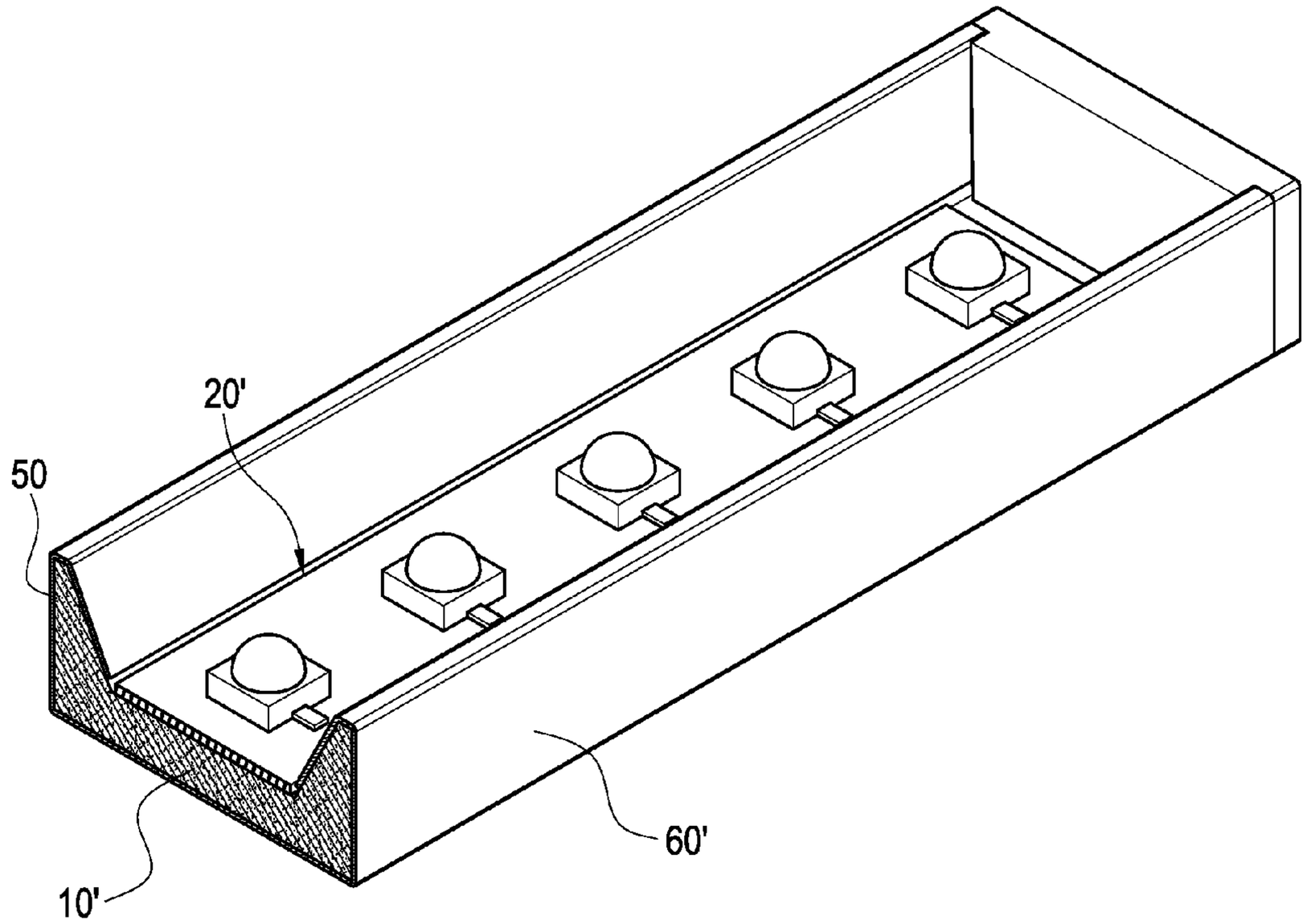


FIG.5

HEAT DISSIPATING STRUCTURE OF LED LAMP CUP MADE OF POROUS MATERIAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to an illumination device, and more particularly to a lightweight light emitting diode (LED) lamp.

2. Description of Prior Art

A general illumination device such as a projection lamp, a road lamp or any other lamp usually comes with a lamp cup manufactured by an aluminum extrusion molding method, and a containing space is formed at the lamp cup for installing a light emitting unit therein, so that light emitted from the light emitting unit can be reflected and/or refracted to provide a light source required in a certain specific area.

If the light emitting unit of the aforementioned illumination device is a high-brightness light emitting body, a heat dissipating device is usually installed to dissipate the high heat produced by the light emitting unit during the light emission to prevent shortening the life of the light emitting unit due to the high heat or increasing the costs of maintenance, repair and use.

The conventional lamp cup is made of a material such as aluminum with a higher coefficient of thermal conductivity, and whose lamp cup and heat dissipating fin are manufactured by an aluminum extrusion method, so that the high heat produced by the light emitting unit can be dissipated. However, if the lamp cup is used for a larger lamp, the total weight of the lamp manufactured by the aluminum extrusion method is heavy, and the aluminum metal has a high cost, and thus the conventional lamp cup incurs a higher manufacturing cost.

In view of the foregoing shortcomings of the prior art, the inventor of the present invention based on years of experience in the related industry to conduct extensive researches and experiments, and finally developed a feasible design to overcome the foregoing shortcomings of the prior art.

SUMMARY OF THE INVENTION

It is a primary objective of the present invention to provide a heat dissipating structure of a lamp cup made of a porous material, and the lamp cup is made of a porous material, such that the structure with the porous material can be used for reducing the weight of the lamp cup, and the material having a high thermal conductivity is used for conducting the heat produced by a light emitting unit.

Another objective of the present invention is to provide a heat dissipating structure of a lamp cup made of a porous material, and the lamp cup is made of a lower priced porous material to reduce the manufacturing cost of the lamp cup.

To achieve the foregoing objectives, the present invention provides a heat dissipating structure of a lamp cup made of a porous material, and the structure comprises a lamp cup made of a porous material, a containing cavity disposed at an end of the lamp cup, a lamp holder covered onto another end of the containing cavity, a metal hood sheathed to the lamp holder and covered onto an external side of the lamp cup, and a heat conduction medium disposed between the lamp cup and the metal hood, such that a light emitting unit is contained and installed in the containing cavity of the lamp cup, and the heat produced by a light emitting unit can be conducted from the lamp cup to the metal hood and dissipated from the metal hood to the outside.

Compared with the prior art, the present invention is characterized in that the lamp cup is made of a porous material, and the structure made of the porous material can reduce the weight of the lamp cup, and the price of the porous material is lower than those made by aluminum extrusion, and thus incurs a lower manufacturing to improve the practicability and cost-effectiveness of the present invention.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an exploded view of a heat dissipating structure of a lamp cup made of a porous material in accordance with a preferred embodiment of the present invention;

FIG. **2** is a perspective view of a heat dissipating structure of a lamp cup made of a porous material in accordance with a preferred embodiment of the present invention;

FIG. **3** is a cross-sectional view of Section **3**-**3** as depicted in FIG. **2**;

FIG. **4** is a schematic view of using a heat dissipating structure of a lamp cup made of a porous material in accordance with a preferred embodiment of the present invention; and

FIG. **5** is a schematic view of a heat dissipating structure of a lamp cup made of a porous material in accordance with another preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The technical characteristics, features and advantages of the present invention will become apparent in the following detailed description of preferred embodiments with reference to the accompanying drawings, and the preferred embodiments are used for illustrating the present invention only, but not intended to limit the scope of the invention.

With reference to FIGS. **1** to **3** for an exploded view, a perspective view and a cross-sectional view of a heat dissipating structure of a lamp cup made of a porous material in accordance with the present invention respectively, and the structure comprises a lamp cup **10** made of a porous material such as silicon carbide, graphite or ceramic, and the structure made of the porous material can reduce the weight of the lamp cup **10**. In addition, the material comes with a high thermal conductivity for facilitating the heat conduction.

The lamp cup **10** has a containing cavity **11** disposed at an end of the lamp cup **10**, a base **12** disposed at another end of the lamp cup **10**, a light emitting unit **20** contained in the containing cavity **11**, and a through hole **121** disposed at the base **12**. In this preferred embodiment, the lamp cup **10** has a substantially bowl-shaped cross section and includes a plurality of ribs **13** disposed on an external surface of the lamp cup **10**. Of course, the invention is not limited to the aforementioned arrangement only, but any other equivalent arrangement can be adopted instead. The light emitting unit **20** is an LED module installed on a circuit board **22** of an LED lamp **21**, and the light emitting unit **20** includes a connecting end **23** for passing through the through hole **121** of the base **12** and connecting a power supply to supply the required power to the light emitting unit **20**.

A lamp holder **30** is covered onto another end of the containing cavity **11** of the lamp cup **10**, and a plurality of heat dissipating holes **31** are disposed on a surface of the lamp holder **30** in this embodiment for facilitating the heat dissipation of the lamp cup **10**, and the lamp holder **30** forms a containing space **32** corresponding to the containing cavity **11** of the lamp cup **10**, and the containing space **32** is provided for installing the LED lamp **21**. In addition, the lamp holder **30** is coupled to a light transmitting body **40**, and the light transmitting body **40** is provided for refracting the light emitted from the light emitting unit **20**.

In FIG. **3**, a heat conduction medium **50** is disposed on a surface of the lamp cup **10**, wherein the heat conduction medium **50** is a highly conductive matter such as copper or tin sprayed or coated on an external surface of lamp cup **10** for quickly conducting the heat absorbed by the lamp cup **10**.

A metal hood **60** is sheathed and coupled to the lamp holder **30** for covering the external side of the lamp cup **10**, wherein the metal hood **60** is a hood made of a metal such as copper or aluminum with a good heat dissipating property and provided for protecting the lamp cup **10**. Since the lamp cup **10** is made of a porous material, it has the advantages of a light weight and a low price, but it is also fragile. The metal hood **60** sheathed and covered onto the lamp cup **10** can prevent the lamp cup **10** from being broken or cracked easily. In addition, the metal hood **60** can prevent external moisture from entering or damaging components inside the lamp cup **10**.

In an assembling process, the light emitting unit **20** is installed to the lamp holder **30**, and the lamp holder **30** is covered onto the lamp cup **10** that is coated with the heat conduction medium **50** for accommodating the light emitting unit **20** in the lamp cup **10**, and the semi-finished good is sheathed into the metal hood **60**, such that the metal hood **60** and the lamp holder **30** are coupled with each other and covered onto the external side of the lamp cup **10**, wherein the lamp cup **10** has a plurality of ribs **13** on its external surface for facilitating an attachment onto an internal wall of the aluminum hood **60**, and a connecting end **23** of the light emitting unit **20** is passed through the through hole **121** of the base **12** of the lamp cup **10** and the metal hood **60** to connect an external power supply (not shown in the figure).

With reference to FIG. **4** for a schematic view of using a lamp cup made of a porous material in accordance with the present invention, a plurality of heat dissipating fins **14** are formed on a surface of the metal hood **60** for expanding the heat dissipating area of the metal hood **60**, wherein a portion of the heat produced by the light emitting unit **20** is disposed from the heat dissipating holes **31** on the surface of the lamp holder **30**, and another large portion of the heat is absorbed by the lamp cup **10**, conducted from the heat conduction medium **50** to the metal hood **60**, and dissipated quickly to the outside by the metal hood **60** and its heat dissipating fins **61**.

With reference to FIG. **5** for a lamp cup made of a porous material in accordance with another preferred embodiment of the present invention, this embodiment is substantially the same as the previous embodiment, and the difference resides on that the lamp cup **10'** of this embodiment has a substantially U-shaped cross section, and a heat conduction medium **50** is disposed on an external surface of the lamp cup **10'**, and a light emitting unit **20'** is contained in the lamp cup **10'**, and an aluminum hood **60'** is sheathed and covered onto an external side of the lamp cup **10'**, and the aluminum hood **60'** is a hood made of aluminum and formed with a shape corresponding to the shape of the lamp cup **10'**. In this embodiment, the lamp cup **10'** is not covered onto the lamp holder to show a clear appearance, and the lamp cup **20'** is covered onto a lamp holder for sealing the light emitting unit **10'** therein.

While the invention has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention set forth in the claims.

What is claimed is:

1. A heat dissipating structure for dissipating heat produced by a light emitting unit, comprising:

a lamp cup comprising a porous material and having a containing cavity and a base extending from the containing cavity;

a lamp holder disposed in the containing cavity to cover the containing cavity, the lamp holder having a containing space for containing a lamp of the light emitting unit;

a heat conduction medium on an external surface of the containing cavity and the base of the lamp cup;

a metal hood covering an entire external side of the containing cavity and an external surface of the base of the lamp cup so that the metal hood and the lamp holder are coupled with each other to sheathe the lamp cup; and

a light transmitting body installed in the containing space for refracting light emitted from the lamp of the light emitting unit, a top surface of the light transmitting body being substantially at the same level with a top surface of the lamp holder.

2. The heat dissipating structure as recited in claim **1**, further comprising a plurality of heat dissipating holes disposed on a surface of the lamp holder for facilitating the heat dissipation of the lamp cup.

3. The heat dissipating structure as recited in claim **1**, wherein the light emitting unit has a connecting end and the base has a through hole for the connecting end of the light emitting unit.

4. The heat dissipating structure as recited in claim **1**, wherein the lamp cup has a plurality of ribs disposed on a surface of the lamp cup and attached onto an internal wall of the metal hood.

5. The heat dissipating structure as recited in claim **1**, wherein the lamp cup has a substantially bowl-shaped cross section.

6. The heat dissipating structure as recited in claim **1**, wherein the lamp cup has a substantially U-shaped cross-section.

7. The heat dissipating structure as recited in claim **1**, wherein the heat conduction medium comprises tin.

8. The heat dissipating structure as recited in claim **1**, wherein the metal hood comprises one of copper or aluminum.

* * * * *